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attaching weights to the corks. The apparatus consists simply of a glass jar, in the bottom of which are fastened several rows of glass tacks. The material necessary for its construction consist of a wide-mouthed jar, a few pieces of glass rod, and a little plaster of Paris. The tacks are made by heating the glass rod and drawing it out to a rather sharp point. It is then cut off at the right length and the cut end softened by heat and then quickly pressed upon some hard surface, so as to form a sort of head. The tacks are then arranged in rows in some shallow dish, previously oiled, and enough plaster of Paris poured around them to form a layer 1½ to 2 c.m. deep. When this hardens, the tacks are firmly held in an upright position, and all that remains to be done is to place the plaster disc in the bottom of the glass jar.

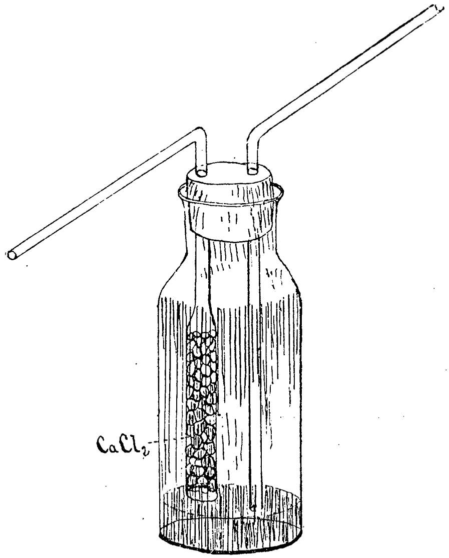

FIG. II. Ether wash-bottle for blowing ether vapor upon collodion or celloidin sections to fasten them to the slide. The tube of calcium chloride (Ca Cl 2) is for dehydrating the ether vapor.

To use the apparatus, fill it partly full of alcohol (60 to 80 per cent.). As the specimens are imbedded on the corks, transfer them to this jar, sticking each cork upon a tack.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

The American Society of Naturalists—Met in Philadelphia, December 29th and 30th, 1891. They discussed a salient point in evolution on the morning of the 30th, and in the afternoon listened to the descriptions of three important expeditions which went out in 1891. The morning session was given up to the reading of four papers on “Definite vs. Fortuitous Variation in Animals and Plants.” Professor Thomas Meehan, Professor J. P. McMurrich, Professor J. A. Allen and

Professor E. D. Cope each read papers on their separate specialties in reference to the subject under discussion. The meeting was called to order on the 29th, by the President, Professor Rice, and the report of the Treasurer of the society was approved. Among the other items in the Treasurer's report was $100 as a subscription to the "American table" at the Naples Zoological Station. Professor H. F. Osborn, of Princeton, introduced Professor Charles W. Stiles, of Washington, that the latter might describe the present status of the Naples Station.

Professor Stiles told of the excellent work done at Naples, where a laboratory has been erected, which is now a centre of investigation for naturalists all over the world. Here the most eminent scientists of all nations assemble to exchange views and study the life that teems in the Bay of Naples. Almost every nation in the world has made a subscription to the station in the form of an endowment for a "table," at which the distinguished scholars may study. The United States was represented for three years through the Smithsonian Institution, but for many years there has been no American table, and those American students who visit the Biological Station do so as a courtesy from foreign nations. The cost of a table is $500 a year.

The American Association for the Advancement of Science has made a donation of $100, which, with the present donation and one or two other gifts from colleges, will greatly aid the work, so that an American table will almost certainly be maintained in 1892.

Looking toward the future maintenance of this table, the Executive Committee recommended that the society memorialize the Smithsonian Institution, recommending that the Institution assume the responsibility of maintaining an American table at the Naples Zoological Station in future years. This recommendation was adopted.

The following members were elected: George V. McLanthalen, Massachusetts Institute of Technology: Henry B. Ward, Harvard College; Charles W. Stiles, Department of Agriculture, Washington; George W. Fuller, Biologist, Massachusetts Board of Health; J. E. Ives, Philadelphia Academy; Robert P. Bigelow, Johns Hopkins University; Alexander H. Philip, Princeton College; Charles Freeman William McClure, Princeton College; William A. Setchell, Yale College; Joel A. Allen, American Museum of Natural History, New York; Henry A. Fernald, State College of Pennsylvania.

The Committee on Nominations recommended the following officers, who were unanimously elected: President, H. Fairfield Osborn, Columbia College; Vice-Presidents, Samuel F. Clarke, Williams College;

George Baur, Clark University; William H. Dall, Smithsonian Institution; Secretary, Thomas H. Morgan, Bryn Mawr College; Treasurer. William T. Sedwick, Massachusetts Institute of Technology; Members of the Executive Committee, J. Playfair McMurrich, University of Cincinnati; W. P. Wilson, University of Pennsylvania.

The papers of the session were then read in succession, a general discussion following. The subject under discussion was "Definite versus Fortuitous Variation." The subject is important to the naturalist as pointing out the method in which species are formed, whether as the result of definite or of purely accidental causes. The first paper was by Professor Thomas Meehan, and considered the question in reference to plants.

PROF. MEEHAN'S ADDRESS.—Professor Thomas Meehan remarked, in opening the discussion, that he was unable to get a distinct conception of definite as opposed to fortuitous variation, but would consider those variations definite that came in expected order and exerted no surprise, and those as fortuitous that were unexpected and unusual, as if influenced by some irregular law, dependent on accidental conditions.

A large number of American trees, he explained, had closely related species in the north of Europe. The American chestnut, he said, had for a relative the Spanish chestnut. It had smaller nuts, smaller twigs and buds, wider internodes, thinner and less serrate leaves, and changed to a bright color in fall. The two, it was assumed by evolutionists, had the same origin, only some accident, some fortuitous circumstance, led to the variation. Strange to say, all the other trees varied from their allies in just the same particulars. Could such a regular series of varitions be due to fortuity? What is more remarkable, this departure from the primitive parent must have been ages ago, yet through the long centuries, and over thousands of miles of varying conditions, the distinct character of these variations has remained the same.

Reference was then made to a large number of variations known in gardens as cut-leaved kinds, blood-leaved, weeping trees, and sports like the nectarine from the peach, and garden roses from the sporting branches—the parents as being under exactly similar conditions, as one great difficulty in believing environment, as generally understood, could have had much influence in producing them. Popular language called these incidents, and science fortuitous, but the element of change must have existed in the organized protoplasm of the single cell, and it was difficult to conceive of any external influence that could act on this single cell and not on those surrounding it.

Water plants, with the varying characteristics in proportion to their growth on land or in water, were referred to, rather as hereditary powers of adaptation than as acquired ones. Carnivorous plants and parasitic plants were referred to in the same connection.

Professor Meehan urged, however, that there were very strong facts in favor of fortuitous variation, as there must necessarily be, to draw so strong a support of that view from eminent men. A comparison of some trees of the Rocky Mountains with identical species on the Pacific was made. They undoubtedly had a common origin within comparatively recent times, and the elevation following the upheaval of the Rockies, was assumed to be the fortuitous circumstance influencing the change. Some of these had wandered so far apart as to be regarded in some cases as distinct species. The hardiness of magnolias, sweet gums and others, from Northern seed, as against seeds of Southern trees, was also touched on. On the other hand, annual plants would not resist frost. The same white frost killed foliage in these as probably did long ages ago.

Heredity was then taken up and the point made that, no matter how originating, all variation was hereditary when once introduced. In this respect there was no difference between what was recognized as a good species or a mere variety.

Concluding, he said: "To my mind it would be unjust to ignore the separate existence of either fortuitous or definite variations. We have not the remotest conception how either of these forces operate on protoplasm. They may eventually be found but varied manifestations of the same power; but while we are arguing as we are to-day, arguing on the separate nature of these two forces, we must concede considerable power to both, with by far the larger influence, to my mind, to definite variation."

INVERTEBRATE ANIMALS.—Professor McMurrich followed with the discussion of the question with reference to invertebrate animals. He compared the question not inaptly to the rolling of a spheroidal body having a larger number of facets over a hard surface. If the ball was uniformly balanced it was a matter of "chance" that is to say, of a large number of causes which could not be determined or analyzed as to which facet it would stop at. If, however, the ball was weighted it would stop definitely on a single facet, or one close to the one selected.

"At present," he said, "there are no extensive observations recorded on the question under discussion, although there are certain special cases which seem to bear more or less directly upon it. The most noteworthy of these is the series of observations made by Schmankewitsch, on the effect of the degree of saltness of the water in which certain animals live upon the form of the body. The form experimented upon was a rather lowly organized crustacean, known as *Artemia salina,* which normally lives in water of a moderate degree of salinity. By gradually increasing the saltness of the water, in the course of several generations, the animals assumed the characteristics of an entirely different species, known as *A. muhlhausenii.* By gradually diluting the moderately salt water with fresh water until it becomes practically fresh, the *A. salina* gradually assumed structural characteristics which rendered it necessary to refer the forms thus obtained to an entirely different genus, *Branchipus.* Here we have, apparently, a very good case of the production of definite variations of form under the influence of external conditions.

A further study of the results, however, brought out some facts which diminish the value of these observations for our present purposes. It was shown that *A. salina* resembled an immature form of Branchipus, while *A. muhlhausenii* represents a stage which is passed over in the immature life of both Branchipus and *A. salina.* In other words, the effect of the salinity of the water was not to produce definite variations of the body form, but to produce an acceleration of the maturity of the reproductive elements, so that in the water of the greatest degree of saltness the animals became mature, while the body form was still in a larval condition.

A few cases have, however, come under my observation which have bearing on the subject. Among the Isopod crustacea of our coast is a form, Jæra, which presents a great variety of coloration; all the variations may however, be reduced to two types, one in which the coloration is uniformly distributed, and the other in which the pigment is arranged in transverse bands. Within these limits the variations are innumerable, but still the variations may be considered definite. A similar variability within definite limits has been described in another Isopod. In certain sea anemones, as well as in certain caterpillars, the color appeared to be due to environment purely.

Comparison of processes of variation to vicarious substitutions which occur in the more complicated silicates of the mineral world was made. The number of substitutions is limited, but within these limits the amount of variation is practically indefinite, if not infinite.

VERTEBRATED ANIMALS.—Professor Allen next spoke on "Variations in Vertebrated Animals. He confined his paper to variations which occur in mammals and birds, as those which occur in the lower forms—reptiles and fishes—are less well known. He said that a rather wide range of individual variation is recognized as inherent in all animals. These variations, however, are usually confined within rather narrow constant limits, any considerable excess beyond the normal range coming into the category of sports and are popularly termed fortuitous. A step further gives malformations and monstrosities. Such extreme departures from the normal, while more rare, are probably no more fortuitous than those less marked. The only difference was that the immediate cause was hard to discover.

He illustrated this point by a number of examples, in which changes were plainly due to geographical and climatic forces. As a result biologists had accepted certain generalizations which might be stated as follows:

First. Baird's law of geographical variation in size, which, announced in 1865, still held its own. It asserted that there was a constant increase in the size of individuals of the same species from the south northward, and from the lowlands toward the higher elevations.

Second. The frequent increase in size of peripheral parts, as the tail, beak and claws of birds, took place from the north southward or inversely to the increase and general size.

Third. A general deepening of the coloration took place from the north southward in North America, east of the plains, together with a reduction of white markings and white areas, and a corresponding increase of dark markings and dark areas and a gradual increase in the intensity of iridescent tints in species thus marked.

Fourth. The loss of color over the interior in both mammals and birds having a continental distribution is marked.

Fifth. There is an extreme intensification of color over the heavy rainfall district of the Northwest coast.

The failure of verification of the first law led to its modification to the following formulæ, first published in 1876, which has stood the test of subsequent investigation:

First. The maximum physical development of the individual is attained where the conditions of environment are most favorable to the life of the species.

Second. The largest species of a group (genus, sub-family or family, as the case might be) are found where the group to which they severally belong reaches its highest development, or where it has what may be termed its centre of distribution.

Third. The most typical or most generalized representatives of a group are found also near its centre of distribution, outlying forms being generally more or less aberrant or specialized.

Many examples from animal and bird life were adduced, the most striking being that of the family of hares, which inhabits the whole of the United States. In conclusion the Professor said:

"While climatic variations are obviously definite, and while the direct action of external conditions exerts a powerful influence in moulding at least the superficial characters, these alone go but a little way toward accounting for the profounder modifications that distinguish the higher groups. For example, it is impossible to conceive that any amount of climatic variations could transform a song sparrow or a robin into a woodpecker or the reverse; in fact, make a woodpecker out of any other form of bird. Here functional evolution—change in habits, use or disuse of parts—must come strongly into play, and, to a less degree, food, isolation, interbreeding the struggle for existence, etc. The modification of organs, as the bill, the wings and tail, in birds, is, in my opinion, the result of definite variation, due to a variety of causes—never to fortuitous variation.

"The use to which an organ is put and its structure have evidently the relation of cause and effect. Modification of structure follow and are produced by change of habit. * * * As already intimated, my own studies have given no evidence of evolution through fortuitous variation; the evidence is all in the other direction. I cannot even conceive of the evolution of a new form through an accidental variation, since the individual in which it appears must necessarily pair with a normal individual, and can thus transmit the new variation only in a lessened degree to its offspring, to be again diluted in the next generation through precisely similar contingencies, and so on until the original deviation is obliterated."

FOSSIL VERTEBRATA.—Professor Cope spoke on the subject from his standpoint.

He discussed the evidence as to the nature of variation as presented by the extinct vertebrata. He remarked that one difficulty attends this branch of the subject in the circumstance that we do not generally possess enough perfect specimens of any one species of extinct vertebrate to make sure of what its variations may have been. Thus it is that in this case we cannot prove that many variations may have existed of a more or less promiscuous character; but it nevertheless remains that the branch of the subject shows that variation has also been direct. It is only necessary to call attention to the leading facts, now well known, thanks largely to the investigations of Americans, of the evolution of the vertebrate skeleton.

He commenced with the highest class, the mammalia, where the evidence is very complete. Such is the simple fact of numerical digital reduction from five in the lower ungulates through the numbers four and three to one, as in the horse; or to four and two, as in the ox and deer. Then carrying the line of variation towards the central parts of the skeleton, Professor Cope described the articulation of the limbs. The development of keels on the metacarpals was mentioned; then the development of facets on the radius at the wrist. Next, the development of the tongue and groove articulation between the radius and ulna proximally, and next the same in the humerus and radius at the elbow. The successive reduction of the ulna was mentioned. The hind limb was next considered, and the progressive process of development was described. The intervertebral articulations were then discussed, and their successive modifications in the artiodactyla described.

These characters all indicate a direct variation of individuals in the direction of perfect mechanical contrivances in the skeleton.

Professor Cope then referred to the presence of the same phenomenon in the dentition of mammalia. He dwelt especially on the evolution of the sectorial teeth of carnivorous forms, from the tritubercular upper molar and tuberculosectorial inferior molar.

The successive variations seen in the reptilian skeleton were then referred to. The development of fins from ambulatory limbs in the Ichthyosauria; next of upright walking types, like the birds, in the Dinosauria, with the pelvic bones thrown back to sustain the weight of the viscera in the same position. Next the evolution of the modern types of lizards and snakes by the development in the length of the suspensoria of the lower jaw to enlarge the gape for swallowing; and second, in the loss of the capitular articulations of the ribs, due to the support of the weight on the ground, just as occurs in the Plesiosaurian reptiles and in the whales, where the body is supported by the water.

Professor Cope stated that his conclusion from these and many other similar facts was that the origin of such variations had not been promiscuous or fortuitous, but direct, and in consequence of the operation of a definite cause. That cause he believed to be growth energy (of which we know little or nothing), directed by the mechanical relations between the animal and its environment.

He stated that this relation determined the forms of the bones and the muscles which moved them. These determined the general arrangement of the viscera and of the circulatory system which supplies nutrition. Behind all other systems, however, lies the nervous system, the director of motion, and this was serially and successively developed under the influence of use, which developed intelligence out of simple sensibility and memory.

Following Professor Cope's paper there was a lively and protracted discussion upon all, participated in by a majority of the members present. Most of the arguments were favorable to definite variation, though the other branch of the topic had a few supporters. For over an hour the discussion was kept up, becoming more interesting with every new phase or branch of the subject presented.

Those who took part in the discussion were Professors George Macloskie, H. W. Conn, J. A. Ryder, George Baur, C. B. Davenport, J. T. Rothrock, H. F. Osborn, H. P. Bowditch, J. P. McMurrich, J. A. Allen, E. D. Cope, W. P. Wilson, T. H. Morgan, R. P. Bigelow, C. W. Stiles, William Libbey, Jr., E. A. Andrews.

Prof. Macloskie, speaking on the mechanical growth, argued that the place where the bones really grow is not where they rub together but another part. Also, that it is an important thing that the environment may retard growth while the reproductive parts are active, and in this way changes may occur on account of the environment.

Prof. Osborn did not think that the evidence was conclusive, for, taking into consideration all cases of the kind, there are some exceptions to the principle that bear strongly against it.

Two points were made by Prof. Conn. First, on the tendency of aquatic beetle larvæ to assume similar forms, in spite of the wide difference and relations of the adults; and second, that in the discussion nothing had been said about indirect or congenital variations.

Professor McMurrich brought out more fully the points of his paper, showing that all variations which are transmitted must pass through the germ cells; that the egg must carry the variation. Also that there is such a thing as individual variation, which does not need to be transmitted.

The second annual meeting of the **American Morphological Society** was held at the Academy of Natural Sciences, Philadelphia, December 28th and 29th. The attendance was good, and much interest was manifested in the proceedings of the Society. The following are the titles of the papers read: R. P. Bigelow, On the development of sense-organs of the Guinea Corn-blubber (Cassiopea); E. D. Cope, On the degeneracy of the scapular and pelvic arches in the Lacertilia; E. B. Wilson, The relation between bilateral symmetry and the cleavage of the ovum; H. F. Osborn, The dentition of Palæonictis, Amblyctonus and Oxyænas; J. P. McMurrich, On the early development of the marine Isopod Jæra; G. Baur, On variation in the genus Tropidurus; C. W. Stiles, On *Spiroptera scutata* Müller: H. F. Osborn, The Evolution of the mammalian molars to and from the trituberculate type; H. B. Ward, Some notes on Nectonema.

The officers for the current year are: President, Professor C. O. Whitman; Vice-President, Professor H. F. Osborn; Secretary-Treasurer, Professor J. P. McMurrich; Members, with the preceding, of the Executive Committee, Professors E. L. Mark and T. H. Morgan.

The Indiana Academy of Science held its seventh annual session in the capitol at Indianapolis, December 30 and 31, 1891. The president of this meeting was Prof. O. P. Hay, Butler University, Irvington, Ind. The unusual number of 98 papers were entered, requiring the Academy to meet, except Wednesday morning and night, in two sections; one devoted to Zoology, Botany and Geology, the other to Physics, Mathematics and Chemistry. Wednesday night President Hay delivered the customary address on "The present state of the Theory of Organic Evolution." The officers for next year are as follows:

President, J. L. CAMPBELL, Crawfordsville, Ind.

Vice-Presidents, J. C. ARTHUR, Lafayette, Ind., W. A. NOYES, Terre Haute, Ind.

Secretary, A. W. BUTLER, Brookville, Ind.

Treasurer, C. A. WALDO, Greencastle, Ind.

Auditors, P. S. BAKER, Greencastle, Ind. W. W. Norman, Greencastle, Ind.

Curators:—

Botany, J. M. COULTER,
Ichthyology, C. H. EIGENMANN,
Geology, S. S. GORBY,
Ornithology, A. W. BUTLER,
Herpetology, O. P. HAY.
Entomology, F. M. WEBSTER,
Mammalogy, E. R. QUICK.

The summer meeting of the Academy will be held by invitation of the faculty of Earlham College, at Richmond, Ind., in May next. At the same time and place will be held the meeting of the Mathematical sections of the State College Association and of the Teachers Association.

The following papers were read:—

Some suggestions to Teachers of Science or Mathematics in High Schools,.. .T. C. Van Nuys
Notes on Numerical Radices, ...C. A. Waldo
The Kankakee and pure water for Northwestern Indiana and Chicago,..J. L. Campbell
Biological Surveys..John M. Coulter
The distribution of tropical forms in Peninsular Florida, ...L. M. Underwood
Unused Forest Resources. ....Stanley Coulter
Preliminary Notes on the Geology of Dearborn county, Ind. ....A. J. Bigney
Jefferson County Cystidians................................Geo. C. Hubbard
Hudson River fossils of Jefferson county, Ind..........Geo. C. Hubbard
The Upper limit of the Lower Silurian at Madison, Ind. ....Geo. C. Hubbard
Variations in the Dynamical Conditions during the deposit Rock beds at Richmond, Ind., By title.................Joseph Moore
The relation of the Keokuk groups of Montgomery county, with the typical locality.................................C. S. Beachler
Comments on the description of species.....................C. S. Beachler
On a deposit of Vertebrate fossils in Colorado..........Amos W. Butler
Topographical evidence of a great and sudden diminution of the ancient water supply of the Wabash river, By title..J. T. Campbell
Source of supply to Medial morains probably from the bottom of the Glacial Channel, By title...........................J. T. Campbell
Notes on a Kansas species of Buckeye...................W. A. Kellerman
On the occurrence of certain Western Plants, near Columbus, Ohio...... ....Aug. D. Selby
Preliminary notes on the genus of Hoffmanseggia.........E. M. Fisher
Preliminary notes on the Flora of Henry county, Ind., By title....................T. B. Redding and Mrs. Rosa Redding Mikels
A new Microtome...Geo. C. Hubbard
Notes on the Organogeny of the Compositæ, By title......G. W. Martin
Notes on the development of the Archegonium and Fertilization in Tsuga canadensis and Pinus sylvestris.........D. M. Mottier
Strange development of Stomata upon Carya alba caused by Phylloxera...................... ....D. A. Owen
Development of the Sporangium and Apical growth of stem of Botrychium virginianum..........................C. L. Holtzman

The Flora of Mt. Orizaba.......................................H. E. Seaton

An apparatus for determining the periodicity of Root Pressure.......................................M. B. Thomas

Condensation of Acetophenone with Ketols, by means of dilute Potassium Cyanide.......................................Alex. Smith

Condensation of Acetone with Benzoin, by means of dilute Potassium Cyanide.......................................Alex. Smith

Pyrone and Pyridone derivatives from Benzoyl-acetone......Alex. Smith

Carbonic Acid in the Urine............T. C. Van Nuys and R. E. Lyons

Results of Estimations of Chlorine in Mineral Waters, by Volhardt's Method.......................................Sherman Davis

The Sugar Beet in Indiana.......................................H. A. Huston

Forms of Nitrogen for Wheat.......................................H. A. Huston

A Copper Ammonium Oxide.......................................P. S. Baker.

Di-benzyl carbinamine.......................................W. A. Noyes

The Character of Well Waters in a thickly populated area, W. A. Noyes

Laboratory and Field Work on the Phosphate of Alumina, ...H. A. Huston

Recent Archæological discoveries in southern Ohio, ...Warren K. Moorehead

Photographing certain natural objects without a camera, ...W. A. Kellerman

Recent methods for the determination of Phosphoric Acid, ...H. A. Huston

The digestibility of the Pentose Carbohydrates, By title ....W. E. Stone

The action of Phenyl-hydrazin on Furfurol, By title......W. E. Stone

A Graphical Solution for Equations of Higher Degree, for both Real and Imaginary Roots.......................A. S. Hathaway

On some Theorems of Intergrations in Quaternions......A. S. Hathaway

The Section of the Anchor Ring..........................W. V. Brown

A note on the Early History of Potential Functions, A. S. Hathaway

Some Geometrical Propositions.......................................C. A. Waldo

Some suggested changes in Notation...........................R. L. Green

An adjustment for the Control Magnet on a Mirror Galvanometer.......................................J. P. Naylor

A combined Wheatstone's Bridge and Potentiometer......J. P. Naylor

Hysteresis Curves for Mitis and other cast iron, J. E. Moore ....and E. M. Tingley

Heating of a Dielectric in a Condenser. Preliminary note ....Albert P. Carman

Science and the Columbia Exposition........................J. L. Campbell
Exploration of Mt. Orizaba..J. T. Scovell
Entomologizing in Mexico..W. S. Blatchley
Distribution of certain Forest Trees, By title............Stanley Coulter
Cleistogamy in Polygonium, By title.........................Stanley Coulter
The Cactus Flora of the Southwest, By title...............W. H. Evans
Methods observed in Archæological research, By title, ...Warren K. Moorehead
The Prehistoric Earthworks of Henry county, Ind., By title ....T. B. Redding
A review of the Holconotidæ..A. B. Ulrey
Some additions to the State Flora from Putnam county ....L. M. Underwood
Connecting forms among the Polyporoid fungi.........L. M. Underwood
On LeConte's Terrapins, Emys concinna and E. floridana, By title..O. P. Hay
The Eggs and Young of certain snakes, By title.............. O. P. Hay
Observations on the Turtles of the genus Malchlemys By title..O. P. Hay
The Gryllidæ of Indiana...W. S. Blatchley
The outlook in the warfare against infection, By title, Theodore Potter
Our present knowledge concerning the Green Triton,.........O. P. Hay
The proper systematic name of the Prairie Rattlesnake......O. P. Hay
The Blind Crayfishes of Indiana....................................W. P. Hay
Remarks on the Crustaceans of Indiana.........................W. P. Hay
Notes on Elaps fulvus...A. J. Bigney
Some observations on Heloderma suspectum..................D. A. Owen
Some observations on Photomicrography......................D. W. Dennis
Disease of the Sugar Beet Root...............Miss Katherine E. Golden
Buffalo Gnats (Simulium) in Indiana and Illinois.........F. M. Webster
The development of the Viviparous fishes of California, By title..Carl H. Eigenmann
Recent additions to the Icthyological Fauna of California, By title..Carl H. Eigenmann
On Indiana Shrews...Amos W. Butler
Some observations on Indiana Birds.........................R. Wes. McBride
Notes on Indiana Birds...Amos W. Butler
The scales of Lepidoptera...M. B. Thomas
The Ægeria of Central Ohio...D. S. Kellicott
Some Insects of Tasmania..F. M. Webster
Early published references to injurious Insects, By title, F. M. Webster

The continuity of the Germ Plasm in Vertebrates, By title ....Carl H. Eigenmann
Biological Stations, By title..Carl H. Eigenmann
The Eyes of Blind Fishes, By title...........................Carl H. Eigenmann
On the presence of an Operculum in the Aspredinidæ, By title ....Carl H. Eigenmann
Notes on Indiana Arididae. Description of onè new species ....W. S. Blatchley
The relation of Neucleaplasm to Cytoplasm in the Segmenting Egg, By title..........................C. H. Eigenmann, R. L. Green
Plant Zones of Arizona, By title........ ....D. T. McDougal
Relation of available Enzym in the Seed to Growth of the Plant... ......J. C. Arthur
The potato Tuber as a means of Transmitting Energy, J. C. Arthur
Contributions to a knowledge of the grain Toxoptera (Toxoptera graminum) By title...............................F. M. Webster

The Second Annual Meeting of the Nebraska Academy of Sciences, was held at the University of Nebraska, commencing Thursday, December 31, 1891. The following papers were read: The President's Address: Specialization in Science. (Dr. Kingsley being absent, the address was read by Dr. C. E. Bessey). The Slime Moulds of Crete, A. T. Bell; The Evolution of Oxygen by Plants, A. F. Woods; Additions to the Flora of Nebraska, Prof. G. D. Swezey; The Flora of the Black Hills. Dr. C. E. Bessey; Metabolism, Dr. H. B. Lowry; A Bacterial Disease of Corn, H. B. Duncanson; Notes on the Flora of the Artesian Well at Lincoln, J. R. Schofield. The officers for '92 are: President, Dr. Charles E. Bessey, Uni. Nebr., Lincoln; Vice-President, Prof. G. D. Swezey, Doane College, Crete; Secretary, W. Edgar Taylor, State Normal School, Peru; Custodian, Lawrence Bruner, Uni. Nebr., Lincoln; Trustees, E. T. Hartley, Lincoln and Dr. H. B. Lowry, Lincoln. W. E. TAYLOR, Sec'y.

Iowa Academy of Sciences.—The sixth annual session was held December 29, 30, 1891 at Des Moines, Iowa. The following papers were read:

Prof. C. C. Nutting—Address, "Systematic Zoology in Colleges."

Miss Minnie Howe—"Some Experiments for the Purpose of Determining the Active Principles of Bread Making."

J. E. Todd—"Striation of Rocks by River Ice." "Further Notes on the Great Central Plain of the Mississippi."

L. H. Pammel—"Bacteria of Milks," with exhibitions of cultures. "Report of Committee on State Flora." "Phœnological Notes." "Experiments in Prevention of Corn Smut."

Dr. W. B. Niles—"The Action of Disinfectants on Nutrient Media."

Herbert Osborn—"The Orthopterous Fauna of Iowa." "Notes on Certain Iowa Diptera."

F. M. Witter—"Notice of an Arrow Point from the Lœss in the City of Muscatine." "The Gas Wells near Letts, Iowa."

G. E. Patrick—"Can Fat be Fed into Milk? i. e. Can the Composition of Milk be Modified by Variations in the Kind of Food?" "Sugar Beets in Iowa."

R. E. Call—"An Abnormal Hyoid Bone in the Human Subject," with exhibition of specimen.

Herbert Osborn and H. A. Gossard—"Notes on Life History of Agallia sanguinolenta."

Charles R. Keyes—"Geological Structure and Relations of the Coal-Bearing Strata of Central Iowa." Brick and Other Clays of Des Moines." "Aluminum in Iowa."

Prof. E. Haworth—(1) "Melanite from Missouri." (2) "Limonite pseudomorphous after Calcite." (3) "Prismatic Sandstone from Madison County, Missouri."

Prof. H. L. Bruner—"Aboriginal Rock Mortar."

Prof. J. L. Tilton—"A Three Legged Snowbird."

Prof. Calvin—"Distinctions between Acervularia davidsonii and A. profunda."

Prof. S. E. Meek—"Fish Fauna of Arkansas and Iowa compared."

Prof. T. H. McBride—"Slime Moulds of Iowa."

Prof. R. E. Call—"The present Status of Artesian Well investigation in Iowa."

Prof. C. C. Nutting—"Report of Committee on State Fauna."

The following Officers for 1892 were elected.

President, C. C. Nutting, Iowa City. First Vice President, L. H. Pammel, Ames. Second Vice President, E. Haworth, Oskaloosa. Secretary and Treasurer, Herbert Osborn, Ames. Executive Council, The Officers, and J. E. Todd, Tabor, F. M. Witter, Muscatine, R. E. Call, Des Moines.

Natural Science Association of Staten Island.—*October 10th, 1891.*—Informal meeting.

The following paper, by Mr. Chas. W. Leng, was read:

Notes of the tribe Hispini. The habits of certain species of Chrysomelidæ, members of the tribe Hispini, were first made known by Dr. Harris in the year 1835, in the Boston Journal of Natural History (vol. I. pp. 141–147) and were restated in his "Insects Injurious to Vegetation" (p. 120). These species are:

Microrhopala vittata Fab., living on Golden Rod. *Odontota rubra* Web., living on Apple, etc. *Odontota dorsalis* Thunb. living on Locust. They all occur in this neighborhood as do several other species belonging to the tribe, but according to Mr. Wm. Beutenmüller's "Catalogue of Transformations" (Journ. N. Y. Micros. Soc. VII. pp. 1–52) no further record has been made of their habits.

I am now able to add some notes on our Staten Island species and especially on the larvæ of *Odontota scapularis* Oliv.

Frequently in the woods, there grows freely a trailing vine of the Pulse family, identified for me by Mr. W. T. Davis as *Phaseolus helvolus* (or in the last edition of Gray's Manual *Strophostylus peduncularis* Ell.) Its leaves are often marred by white blotches, the parts affected consisting only of the colorless epidermis of the leaf, its substance having been devoured by the larva of the *Odontota.* In early June the beetles are found upon these plants in copulation or perhaps the female in the act of ovipositing. The eggs are irregular, rough, black masses, about one millimeter in diameter and are attached to the under side of the leaf, usually singly. The larvæ are oblong, flattened, somewhat cuneiform in outline, soft and of a whitish color except the head which is piceous and corneous. They are, of course, minute when first hatched, but continue to grow larger, always living within the leaf and enlarging the white blotch as they eat, until by September they have attained a length of one-fourth inch. The pupal stage is probably of short duration. The beetle is black, roughly sculptured, and has the humeral angles reddish. It is, from an ignorance of its habits perhaps, accounted rare by some collectors, but in the woods of Middletown and in Britton's woods, where its food plant grows freely, it is during June one of the abundant insects, and late in the summer still occurs.

Microrhopala vittata, living on Golden Rod, oviposits and perfects its transformation earlier than the *Odontata* and frequently three or four larvæ inhabit the same leaf. *Solidago canadensis* is especially favored by this beetle and early in August the lower leaves will be found browned and entirely eaten, and in the pocket formed by the separation of their two surfaces after the larvæ have eaten away the interior are the freshly hatched beetles. From that date the second brood lives on the plants and eats the leaves into sieve-like forms, and now in October, the tops also appear to be attacked. They are closely imbricated and the beetles are nestling in the narrow crevices.

Several other species of the tribe live on Staten Island, but I am yet ignorant of their food plants.

Mr. Arthur Hollick called attention to the gratifying manner in which the law relating to the protection of song birds was being enforced in the country. During the past two weeks at least three gunners had been arrested and heavily fined. On October 1st, one Gustav Merle, of New York, was arrested and fined $140 by Justice Augustus Acker. He was caught with twenty-three dead birds in his possession, which Mr. Hollick assisted in identifying as follows: 8 high-holders (*Colaptes auratus*), 2 yellow-bellied wood-peckers (*Sphyrapicus varius*), 9 hermit thrushes (*Turdus pallasii*), 3 cat birds (*Mimus carolinensis*), and 1 titmouse (*Parus atricapillus*).

December 12th, 1891.—Informal meeting.

.Mr. L. P. Gratacap, showed a thin section of the coarse trap rock from Lambert's Lane, mentioned in the proceedings of June 13, 1891, and read the following further memorandum in connection with it:

This coarse trap, previously alluded to as possibly containing hypersthene has been since examined microscopically and found to be a true diorite, made up of hornblende, plagioclase, feldspar and quartz, with traces of serpentization, due to alteration. It does not contain hypersthene. In hand specimens it is markedly different from the usual fine grained, compact trap from the Graniteville quarries and would not form as good a stone for road making and other economic uses as does the latter.

Mr. Gratacap also presented the following views in regard to the trap dike and its possible influence on the water supply of the region:

The trap dike on our island, which expands into a widened area at the Elm Park quarry, passes from that point south-westerly in a narrowed ridge, scarcely observable beneath the mantle of drift which covers it until at Graniteville it again is distended into a dome-like nucleus, which extends to the east-ward to the Church road, at Krumm's tavern, where the trap rock is only some seven feet or less below the surface. From this point it sinks and is found again on the surface south of Lambert's Lane, where the road ascends its somewhat steeply sloping sides. Now the question seems an interesting one whether the springs on the north-west side of the trap ridge may not be regarded as flowing from heads of water in New Jersey, as the trap dike would seem to preclude the derivation of their supply from the water shed of the hilly parts of the Island. The low flat lands enclosed in the curved arm of the trap, which, as is well known, stretches out into Long Neck, is mainly a sandy region and I think does not possess the arrangement of impervious drift clay and water-bearing gravels noticeable in our water-bearing district. Just a few rods from Graniteville, on the Old Place road, there rises a spring which seems to come up on the eastern wall of the trap, and at Lambert's Lane, where the coarse trap rock crops out on the surface, a spring comes up on the west side of the trap. Do these two springs acquire the hydrostatic pressure which makes them spring from different quarters, and in each case is the wall of trap the cause of their rising where they do? Furthermore the ridge south of Long Neck, and separated from the latter by a shallow hollow, up which an arm of the Fresh Kills extends, so exactly imitates the low, rounded and long dome-like back of Long Neck itself and so suggests that there is a bifurcation of the trap ridge, or a parallel vent at this point, and if so the wells of the Crystal Water Works, at the end of this ridge, are also separated from the water shed of the Island by a trap wall and may represent a water source situated in New Jersey. Springs are found on either side of this suppositional second (?) trap flow and it may form a deep-seated barrier between two different areas of water drainage, the area north and west of it belonging to New Jersey, the area south or east of it probably insular.

Mr. Arthur Hollick called attention to the fact that in a paper entitled "A Few Words About Our Water Supply," published in the Staten Island Magazine for August 1888, the relation of the trap dike to the water supply was commented upon in the following words: "I can well remember the mystery which was supposed to be inseparable from the source of the springs [east of the trap ridge] * * * * some persons even went as far as the Orange Mountains in New Jersey to account for them, utterly ignoring the fact that the immense trap dike, which begins at the Palisades, forms Bergen Neck, crosses the Kills and extends through our Island from Port Richmond to Linoleumville, entirely cuts them off from this source."

Mr. Hollick remarked that it was a matter of considerable interest to find that two observers had arrived independently at practically the same conclusions in regard to the trap dike as a barrier between different water sheds.

Pieces of a drift bowlder of Lower Helderberg limestone, found at Arrochar, was shown by Mr. Gratacap, in which the following fossils were identified: *Meristina arcuata* Hall; *Spirifera macropleura* Conrad; *Strophodonta beckii* Hall; *Strophomena rhomboidalis* Wahl; *Orthis subcarinata* Hall; *Eatonia medialis* Vanuxem; *Cœlaspira concava* Hall; *C. imbricata* Hall; and *Gosselettia mytilimera* Conrad. The last five not previously reported from the Island. Also portions of a similar bowlder from the shore of Tottenville, containing *Tentaculites gyracanthus* Eaton, and *Fistulipora?* sp.?, both new to the Island.

A note from Mr. Ira K. Morris was read, in which he stated that the sketch of old Richmond County Hall, from which was prepared the cut printed in the proceedings of September 12th, 1891, was made in September 1890. The building has since been entirely torn down.

SCIENTIFIC NEWS.

—Dr. Wilhelm Karl von Nageli, the late keeper of the Botanical Museum and Garden in Munich, who died recently in his seventy-fourth year, was a Swiss by birth. He was for some years Professor of Botany at the University of Zurich, but in 1857 was invited by King Maximilian II to the post which he so long occupied. He was a many-sided man, a great mathematician and microscopist, as he showed in his *Das Mikroskop*. His contributions to Alpine botany are numerous. The post darwinian form of the doctrine of Evolution found an energetic opponent in Nageli. The Swiss papers give a long list of his works. His study throughout life, as he said, was to understand the " very least of the very little."

—C. W. Stiles has been elected to the Societe de Biologie (Paris) to the vacancy caused by the death of Prof. Leidy (Membre correspondant etranger).

—The company quarrying limestone on Kelley Island, Lake Erie, has presented to the Western Reserve Historical Society of Cleveland, a portion of the remarkable glacial grooves at that locality. Prof. G. F. Wright of Oberlin writes to the *Cleveland Leader* as follows:

The direction of these grooves is a little south of west, corresponding to that of the axis of the lake. This is nearly at right angles to the